

MOBILE WIRELESS COMMUNICATION HANDSET WITH SOUND MIXER AND METHODS THEREFOR

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FIELD OF THE INVENTIONS

The present inventions relate generally to mobile wireless communication devices, and more particularly to handheld cellular communication devices capable of mixing and playing polyphonic audio files and methods therefor.

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BACKGROUND OF THE INVENTIONS

Cellular handsets having sound mixers are known generally. In the P503i i-mode cellular telephone available from NTT DoCoMo, for example, the user must first select several soundtracks and then manually mix the selections. Particularly, the user first selects a music Category (Rock, Dance, Pops, etc.) soundtrack and then first and second Backing Pattern soundtracks in corresponding menus displayed sequentially after each selection. In the P503i cellular telephone, the selected soundtracks are mixed manually only after making all selections. Thus in the P503i cellular telephone, the user cannot listen to more than one selected soundtrack at a time during the soundtrack selection process until after making all selections and manually mixing, since only individual soundtracks are played during the selection process. The P503i cellular telephone also permits the user to adjust the Key and Tempo of the mix, but selected changes in these characteristics cannot be heard until after making the selections and manually mixing.

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The various aspects, features and advantages of the present invention will become more fully apparent to those having ordinary skill in the art upon careful consideration of the following Detailed Description of the Invention with the accompanying drawings described below.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exemplary mobile wireless communication handset.

FIG. 2 is an exemplary process flow diagram for implementing various aspects of the inventions.

FIG. 3 is an exemplary soundtrack data set file stored on the handset.

FIG. 4 is an exemplary audio mix data reference file.

DETAILED DESCRIPTION OF THE INVENTIONS

FIG. 1 is a handheld mobile wireless communication device comprising generally a processor 10 and a DSP 12, memory 20, for example ROM, RAM, EEPROM, etc., a transmitter and receiver 30, inputs 40, for example a keypad and/or joystick, microphone etc., outputs 50 including an audio output and an output signal connector interface, and a display 60.

The mobile wireless communication handset may be, for example, a cellular telephone, personal digital assistant, one-way or two-way pager, or some other handheld mobile communication device.

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The inventions are drawn generally to methods for dynamically
creating polyphonic audio mixes on the handheld mobile wireless communication
devices, and generally to methods for creating and storing polyphonic mixes using
only limited data storage resources on wireless communications handsets, and
generally to methods for integrating audio data reference files and soundtrack
data files in the form of a polyphonic audio format file for uploading from wireless
communications handsets, and combinations thereof.

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The inventions are implemented generally in software on handheld
mobile wireless communication devices, including a polyphonic audio synthesizer
software program. In one embodiment, the audio synthesizer is a MIDI standard
synthesizer, known by those of ordinary skill in the art. In other embodiments, the
synthesizer may be of another standard or a proprietary audio file synthesizer.
The implementation of audio synthesizers on cellular handsets is known generally
as discussed above in the Background of the instant specification.

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The software is invoked by a user input command. In one
embodiment, a polyphonic audio mix is created on a handheld mobile wireless
communication device by selecting a first soundtrack, and playing the first
soundtrack upon selection thereof. In the present inventions, unless indicated
otherwise, the playing of a soundtrack or sound effect of one or all of the
soundtracks of the polyphonic mix occurs upon selection thereof, without
additional input by the user.

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While the one soundtrack is playing, for example the first selected
soundtrack, a subsequent or second soundtrack is selected and played along with
the one or more prior selected soundtracks. Thus by selecting and playing each
subsequently selected soundtrack while one or more previously selected
soundtracks are playing, the polyphonic audio mix is mixed dynamically as it is